ABSTRACT

An apparatus and method for detecting radiation damage in an area of brain tissues, where the area of brain tissues has at least a first region containing brain tissues damaged from radiation exposure and a second region containing no brain tissues damaged from radiation exposure. In one embodiment, the method includes the steps of illuminating in vivo the area of brain tissues with a coherent light at an incident wavelength, λ_0, between 330 nm and 360 nm, collecting electromagnetic emission returned from the illuminated brain tissues, and identifying a first peak of intensity of the collected electromagnetic emission at a first wavelength, λ_1, and a second peak of intensity of the collected electromagnetic emission at a second wavelength, λ_2, wherein λ_0, λ_1, and λ_2 satisfy the following relationship of $\lambda_1 > \lambda_2 > \lambda_0$. The method further includes the step of locating the first region containing brain tissues damaged from radiation exposure as the region of brain tissues where the first peak of intensity of the collected electromagnetic emission is corresponding to.